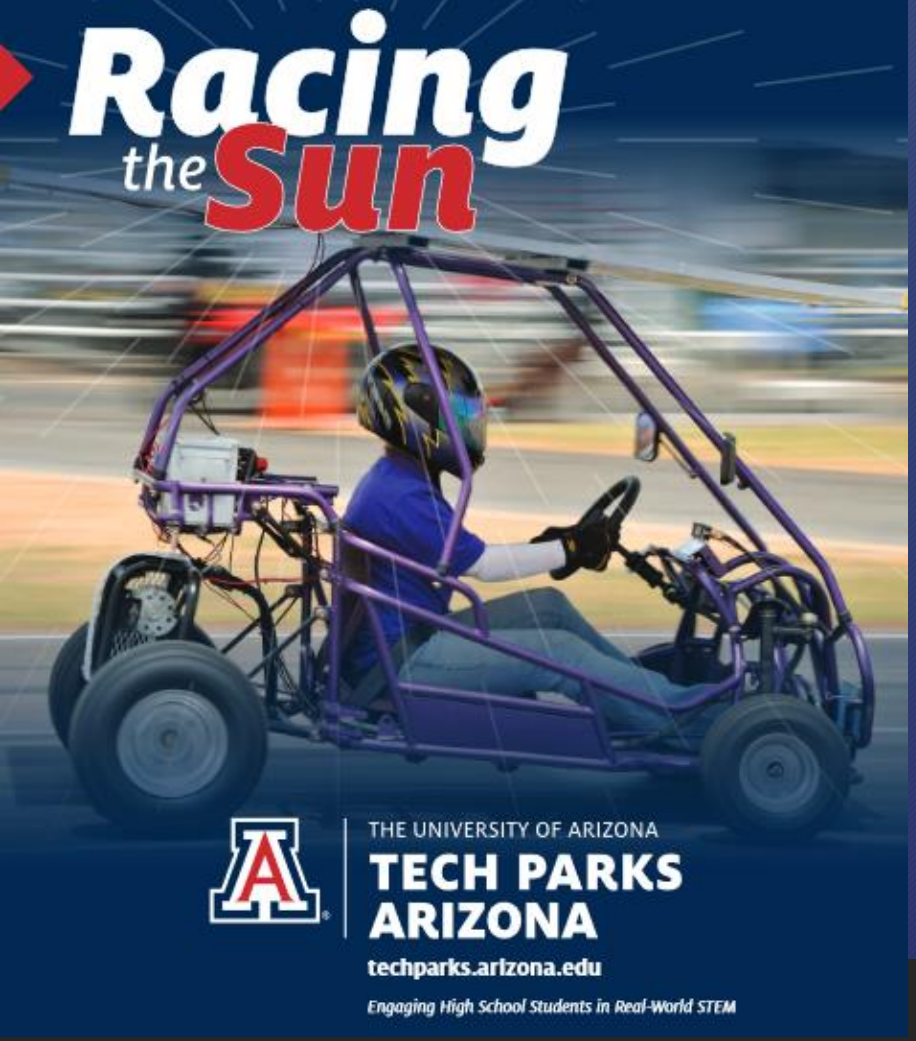
CAS Solar Go-Kart Racing Team

RACING THE SUN



Blazing Eagles

2016, 2017 & 2018 State Champions!

2019 Team Members

- In our first year (2015), we had 7 students form a team …

Now, the 2019 CAS Team has 25 students (or 16% of our school population)

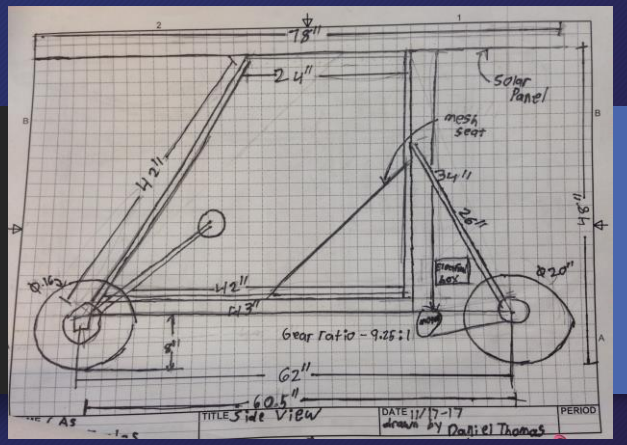
Split into three competing teams – including an all-girls team!

Coaches:

Jeff Ofstedahl

Dave Dolifka

Mechanical Elements (2018 Maker Kart)



The Chassis is 1-inch square steel tubing with fixed suspension, with a mesh seat and belly pan.

Our wheels are 26-inch bicycle wheels with two front disc brakes

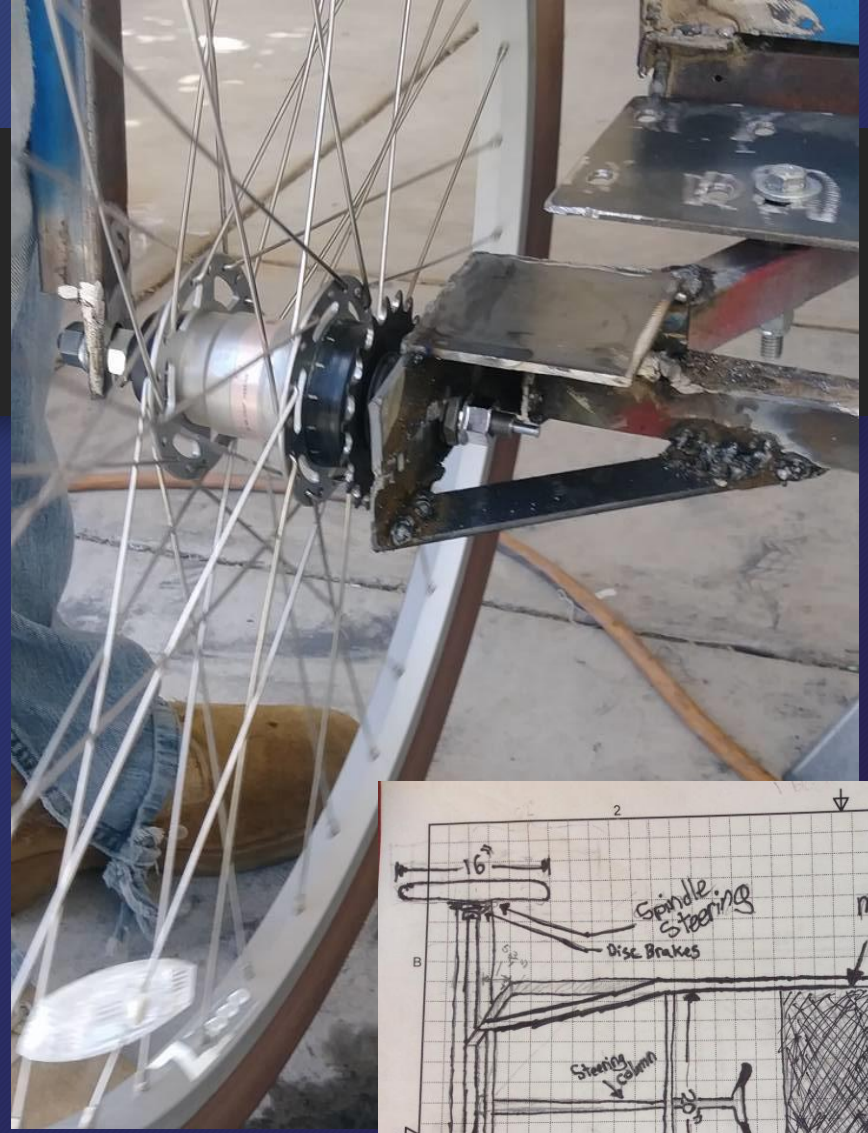
Steering is “tank style” with a motorcycle-style throttle.

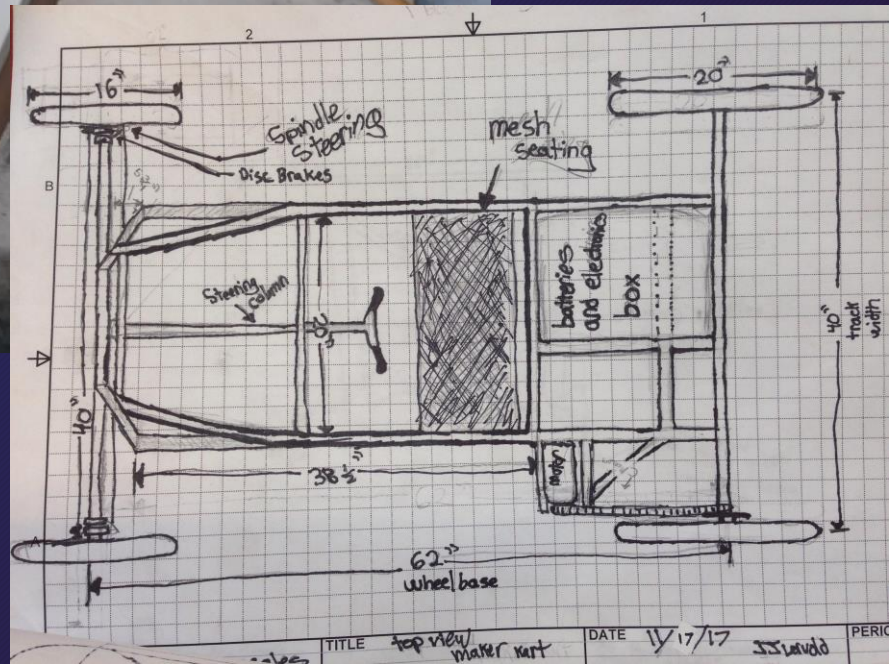
Mechanical Elements

We started with a gear ratio of 9.75.

During Test Day, we realized this wasn't competitive enough nor did it have enough torque at start on an uphill.

We changed our drive train for a total gear ratio of 4.76 (using a jackshaft) with an internal 3-gear hub for increasing the gear ratio during the race by shifting gears.



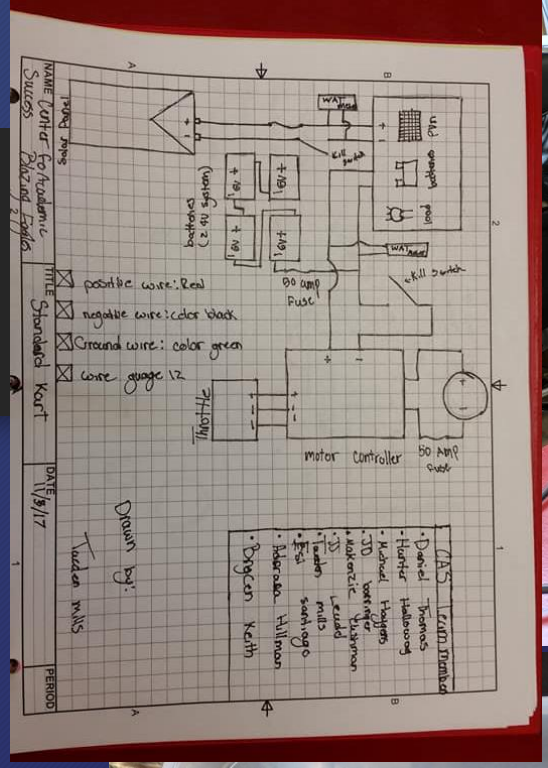


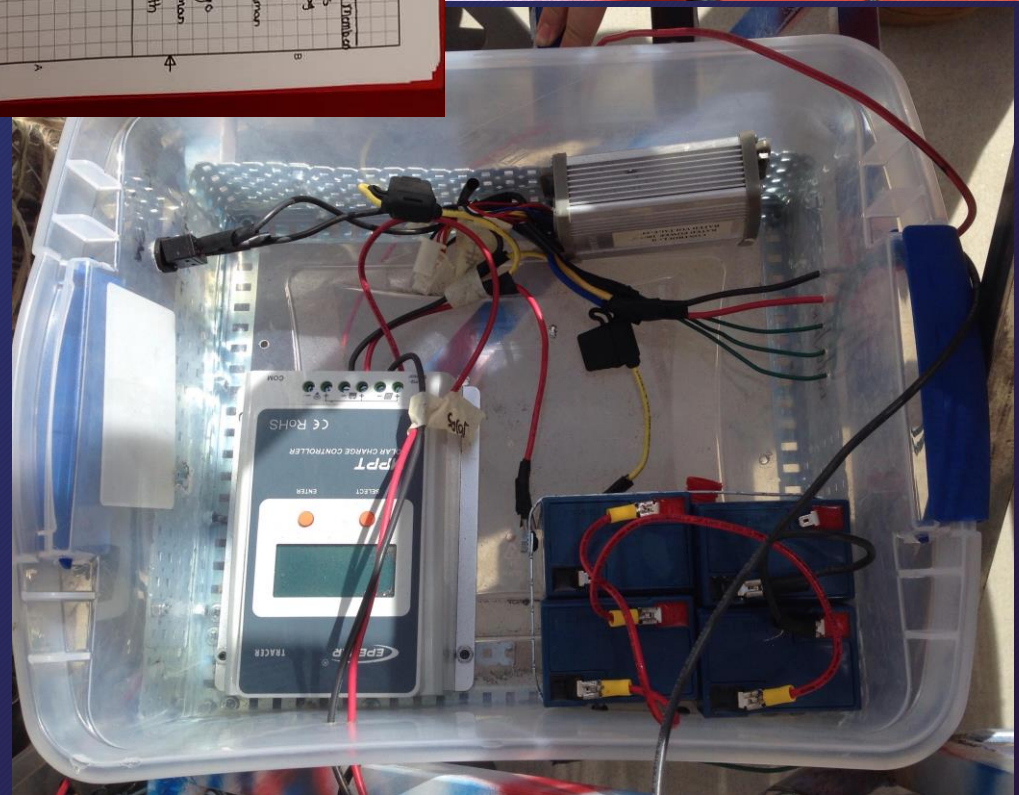
Electrical Elements

Our maker kart has four 6-volt batteries in a series to create a 24-volt system.

The 24-V solar panel is putting out 42-V in open circuit

Additional electronic features include a charge controller and a motor controller and watt meters.





Budgeting

We received various sponsor-ships: in cash and in-kind.

Total cash donations/income: $2,125

(CAS Aftercare 21st Century grant paid for the team entrance fee of $2,000)

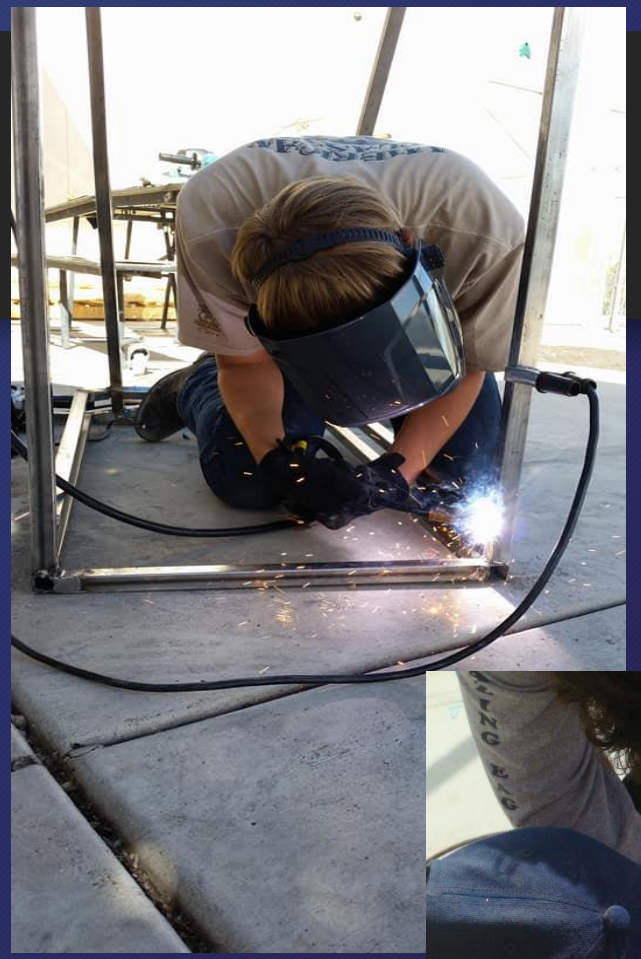
Sold Team Shirts as fundraiser
Did Cars in the Park fundraiser

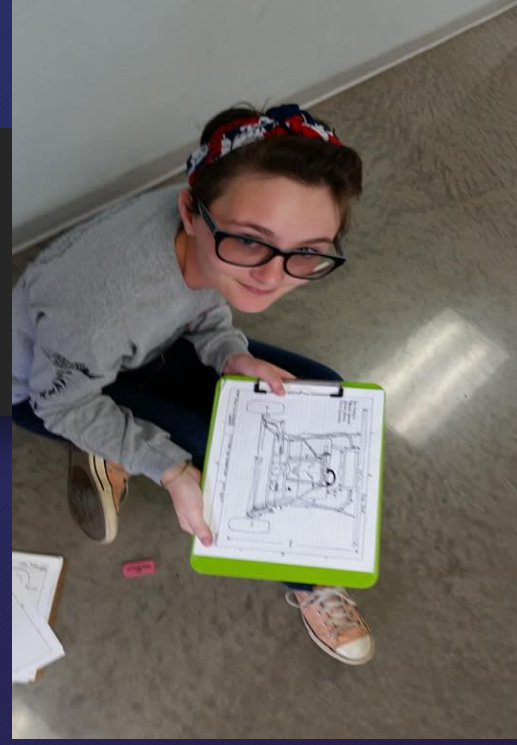
Total expenses to date: $1358
Excess $$s raised to upgrade tools for next year.

Time Trials!

Major Challenges

- The team meets on Fridays – and Saturdays as needed
- Our School doesn't have an auto shop or welding shop
- Our kart wasn't as competitive as we needed it to be. In the month prior to Race Day, we disassembled, redesigned, and refabricated the chassis to have a lower center of mass – all in one month!
- We changed our gearing system and drive train to be able to shift gears during the race to get more torque at the starting line and more speed throughout the race.



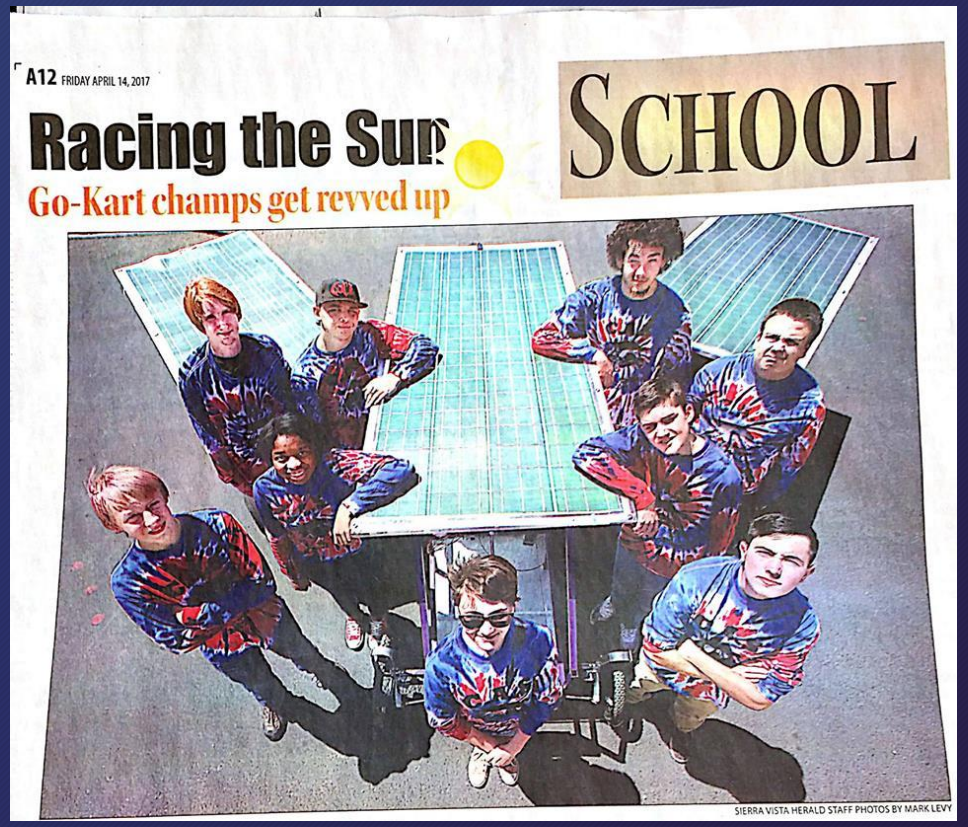


What we learned…

- We learned about gear ratios, and circuitry, and used that to our advantage with our kart. We were able to see what we were learning, it opened our eyes to how engineering works.

"I learned how to be a better welder and different techniques, and how to communicate with people better"-Cody Roehsler

"I learned how important leadership and communication skills are to the team."
-Makenzi Cushman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Racing the Sun

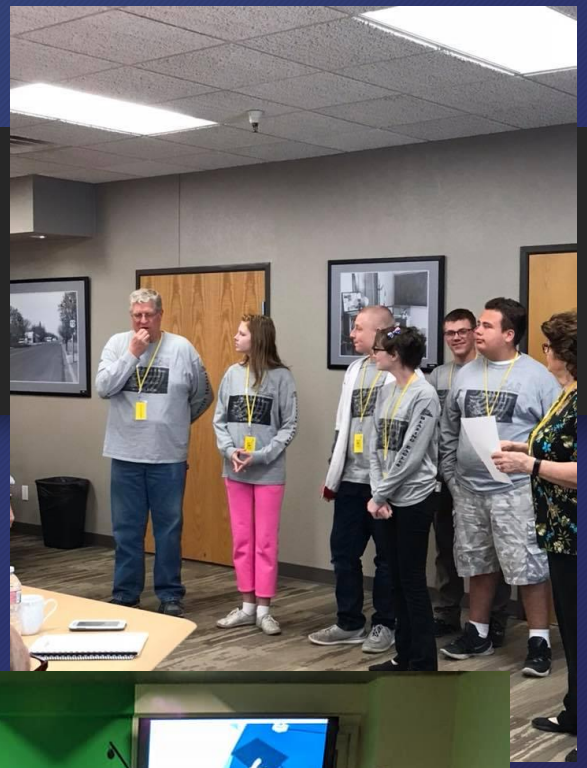
SCHOOL

Go-Kart champs get revved up

SIERRA VISTA HERALD STAFF PHOTOS BY MARK LEVY

We were able to work together to power the kart to the best of its ability. We realized that together, we can accomplish anything.

Our Adventures!



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Center for Academic Success instructor Jeff Olstedahl holds a quick meeting with students Daniel Thomas, J.D. Barringer, Michael Heygens and Makenzi Cushman at Saturday's Cars in the Park. The students, all members of the school's solar powered Go-Kart racing team, showcased two of the solar vehicles at the car show.

Racing to the top

CAS team wins big with solar-powered Go-Karts

BY DANA COLE

Amid the muscle cars, sleek Corvettes and massive trucks at Cars in the Park last Saturday, a group of high school students put their own spin on the automotive event.

The Center for Academic Success (CAS) Solar Go-Kart Racing Team had two vehicles on display, built by the students as a Racing the Sun project organized by the University of Arizona Tech Park. The CAS racing team has the distinction of winning back-to-back state championships in the 2016 and 2017 Racing the Sun competition, an event held every May at Mirasol mon Honda Circuit track in Tucson.

Four members of the CAS racing team were at Cars in the Park to demonstrate the solar powered vehicles and answer questions.

"The CAS Solar Go-Kart Racing Team is actually a club" said Makenzi Cushman, a junior who is one of the winning drivers. "It's a club based on concepts tied to STEM (Science, Technology, Engineering and Math). We're judged on how fast we do the race and we're judged on endurance and efficiency, or how much power we use from start to finish."

Students at CAS enter two different categories, based on how their solar-powered vehicles are built.

"There is a standard kit and a maker kit," said Cushman.

"The standard kit is purchased through Racing the Sun and each team is required to build the go-kart to specifications set by the kit and race the finished product. In the maker kit category, students are required to build a kart from the ground up.

"No part of this project is easy," said instructor Jeff Olstedahl, called "Mr. O!" by the students.

Olstedahl, who is the engineering and math teacher, works with the students and oversees the projects. "The state championship, which is what we won, is based on total overall points," he said.

While students receive points for winning the race, they also earn points for meeting a number of deadlines throughout the year.

"They must produce a project plan, come up with a budget and draw up electrical and mechanical plans," Olstedahl said. "All of these take a lot of time and must be completed in the timeframe set by Racing the Sun."

The team is required to attend workshops at the UA Tech Park, where they learn about circuits, automotive geometry, safety and how to create a project plan.

"There also is a STEM career day at the Tech Park which they attend," said Olstedahl.

Seventeen schools and 22 teams have participated in past competitions. CAS is one of the 17 schools with two vehicles entered.

Makenzi Cushman is our maker driver and JJ Leyvold, a freshman student, will be driving

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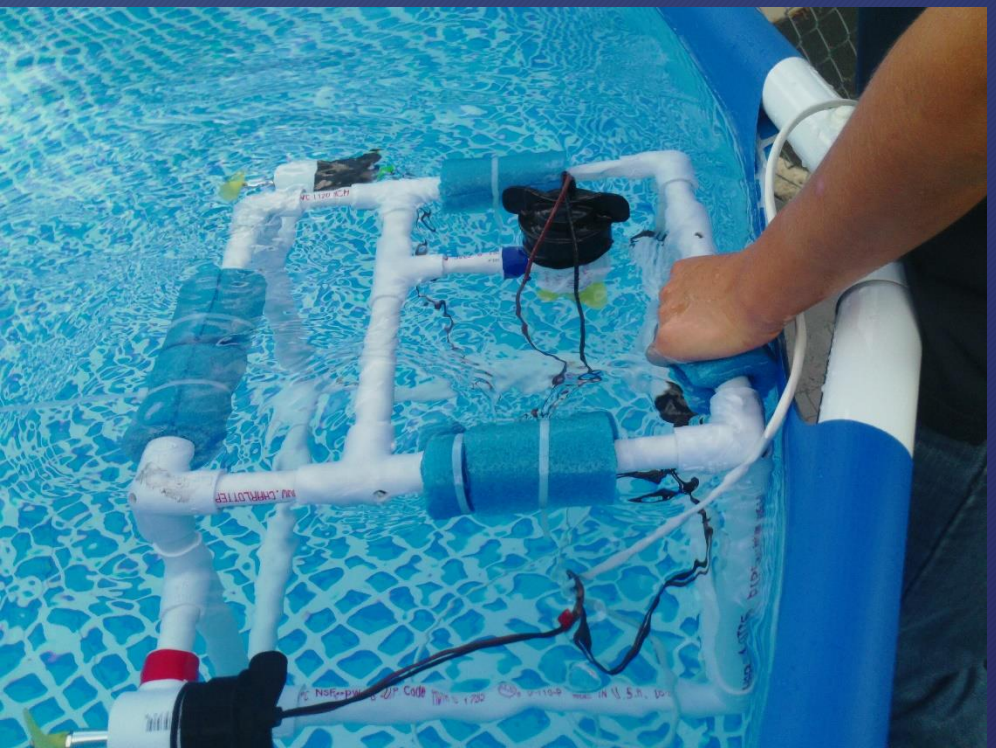
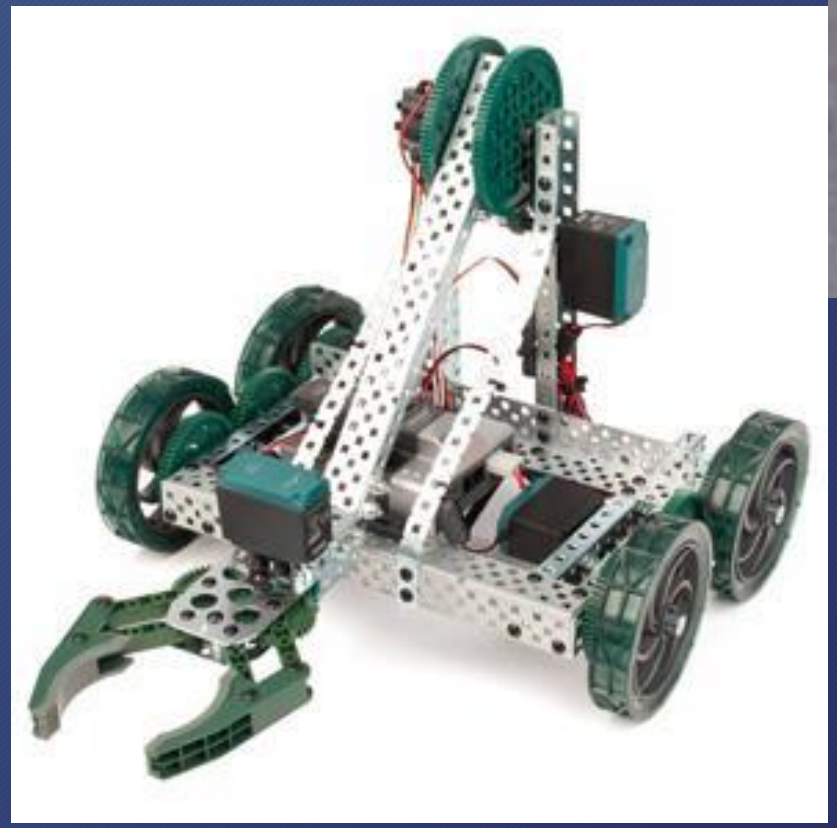
Center for Academic Success students Makenzi Cushman, Daniel Thomas and Michael Heygens, push a solar powered Go-Kart off a ramp at Saturday's Cars in the Park.

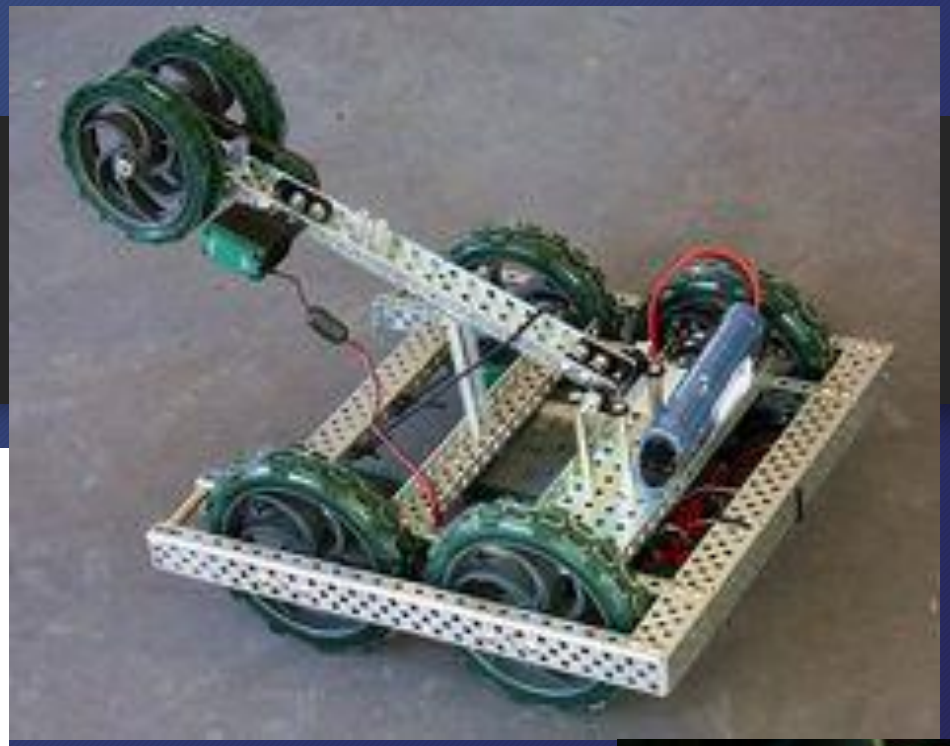
Additional CAS STEM Opportunities

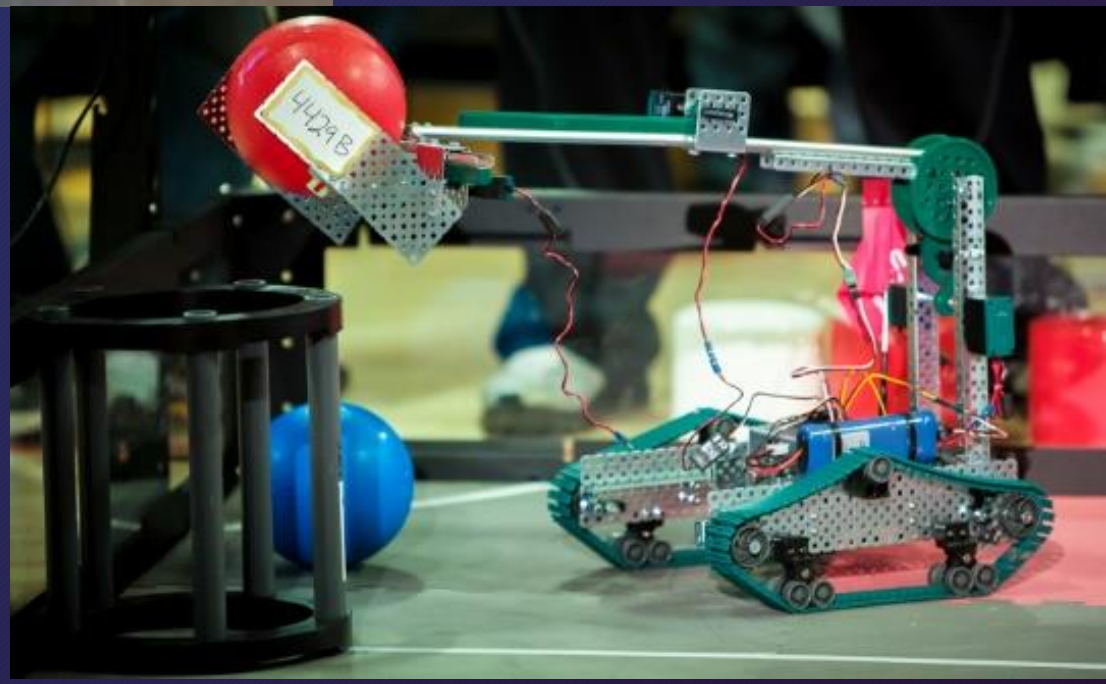
Underwater Robotics



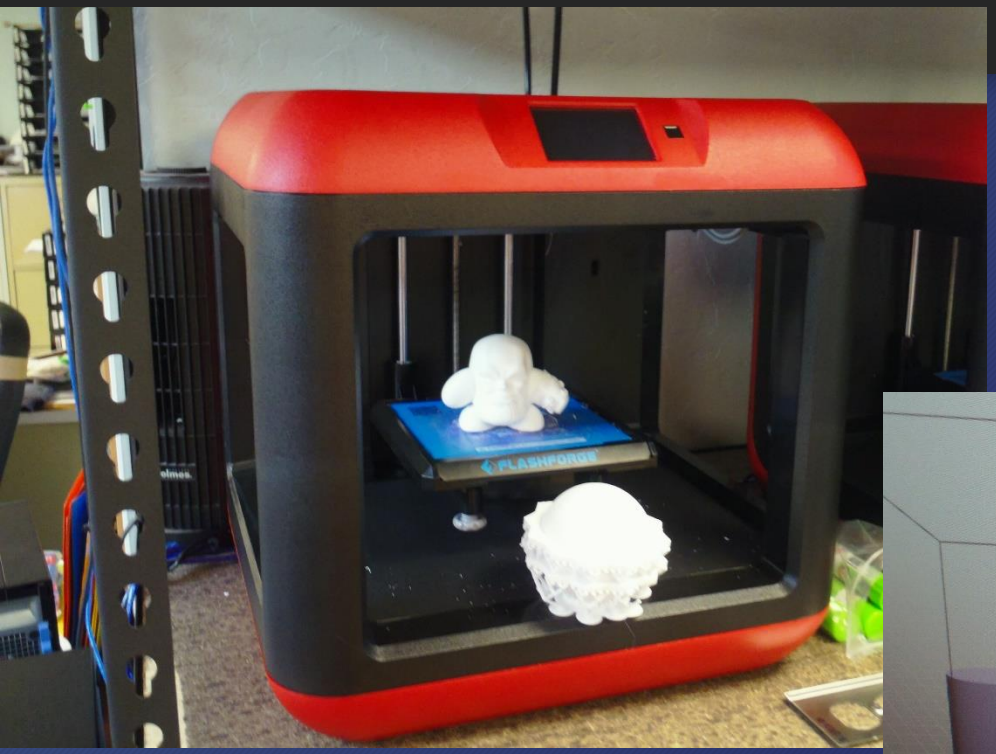
Robotics

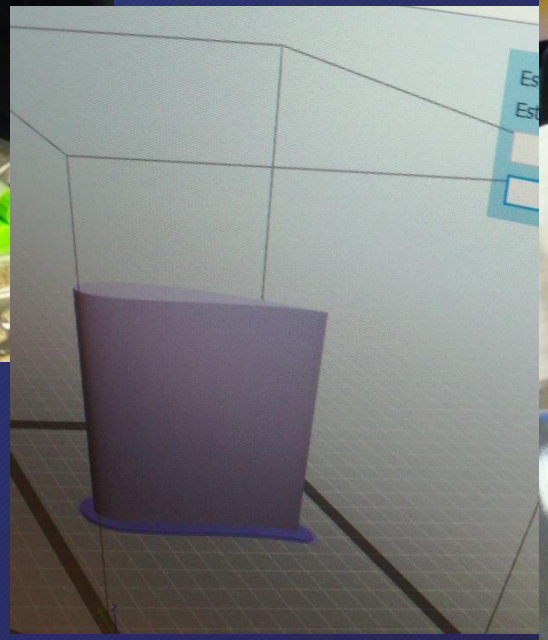


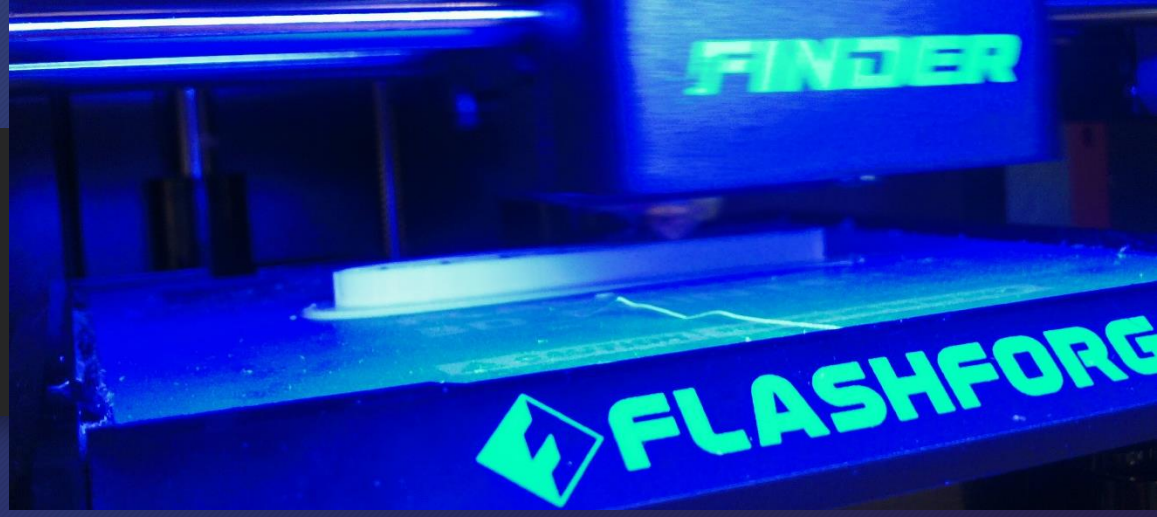




3D Printing Makerspace







CAS STEM Course Offerings

PROJECT LEAD THE WAY
PLTW

- Engineering Design
- Principles of Engineering (applied physics)
- Environmental Engineering
- Civil Engineering and Architecture
- Aerospace Engineering
- Digital Electronics

CISCO™

- Intro to Computer Science
- IT Technologies
- Cyber Security
- Cyber Patriots

- App Creators
- CS Innovators and Makers

Middle School: Automation & Robotics, Electrons and Electronics, Environmental Engineering, Design & Modeling